Amendments to the Specification:

The line numbering in the following instructions refers to the marginal line numbering as set forth in the application.

Please replace the paragraph at page 1, lines 3–9, with the following amended paragraph:

Field of the Invention

The invention concerns an electrically conductive adhesive, in particular for current collectors, an electrode and secondary battery comprising such an adhesive, and further a method for the production of such an electrode. In particular, the invention relates to an adhesive for electrodes in lithium batteries, including lithium-polymer batteries.

Please replace the paragraph at page 1, lines 11–19, with the following amended paragraph:

Background of the Invention

In the production of lithium batteries, ~~the~~ a problem exists ~~consists~~ in the production of ~~the~~ capacity-determining electrodes, ~~of~~ in both the anode and the cathode. The electrodes are electrically conductive materials formed on the basis of electrically conductive polymers and/or metal foils (current collectors) that are coated with active anode or cathode materials. ~~Hereby, current~~ Current collector materials made of copper and aluminum cause particular problems.

Please replace the paragraph at page 1, lines 21–26, with the following amended paragraph:

The adhesive is supposed to guarantee the adherence of the active anode and cathode material to the respective current collectors~~, i.e. a detachment~~. Detachment should not occur during battery fabrication and also during battery operation, i.e. ~~the~~ cycling (charging/discharging), with more than 500 cycles~~, may not occur~~.

Please replace the paragraph at page 1, lines 28–30, with the following amended paragraph:

To solve the detachment problem, electrodes with metal oxides (SnO_2, In-oxide) (US-A-5,616,437) were proposed in the state of the art.

Please replace the paragraph at page 2, lines 1-9, with the following amended paragraph:

US-A-5,441,830 and US-A-5,464,707 describe the production of adhesives for conductive plastic films that are to be utilized as current collectors. ~~Hereby, the~~ The monomers are provided with a conductive additive, laminated to the films, and polymerized through electron beams. Acrylic acid, chloroacrylic acid, bromoacrylic acid, or vinylsulfonic acid are used as monomers. Polyacrylic acid individually or in a mixture with polyethylene oxide is also utilized as a polymer binder for the adhesive.

Please replace the paragraph at page 2, lines 29-34, with the following amended paragraph:

However, all adhesives described so far show serious disadvantages when it comes to the adherence of active anode materials on the basis of carbons that are capable of intercalation, or the adherence of active cathode materials on the basis of transition metal oxides with intercalated Li to copper or, primarily, to aluminum, current collectors.

Please replace the paragraph at page 3, lines 1-4, with the following amended paragraph:

~~The adherence~~ Adherence is either absent ~~not there at all~~ or so inadequate that during the discharge/charge process of the battery, a distinct failure behavior occurs ~~already~~ after a few cycles, and the system is not suitable for the market.

Please replace the paragraph at page 3, lines 15-19, with the following amended paragraphs:

Summary of the Invention

~~This object may be solved by an adhesive according to claim 1, as well as by an improved electrode and secondary battery according to the claims 19 and 30, respectively, and a new production method for improved electrodes according to claim 32.~~ These objects may be achieved by an electrically conductive adhesive, an improved electrode, a secondary battery and a production method for the improved electrode.

The electrically conductive adhesive of the present invention

comprises an aqueously dispersed fluoropolymer, an amine or ammonium salt of a perfluorocarboxylic acid, and a conductive material.

The improved electrode comprises a current collector, an electrically conductive adhesive according to the present invention, and an active electrode material. The secondary battery comprises at least one anode, at least one cathode, and at least one separator, wherein the at least one anode and the at least one cathode comprise the aforementioned improved electrode.

According to the electrode production method, an electrode comprising a current collector, an adhesive, and an active electrode material is prepared by providing a mixture of the adhesive of the present invention and the active electrode material; applying the mixture to a surface of a current collector; and drying the applied mixture.

Please replace the paragraph at page 3, lines 26-30, with the following amended paragraph:

Detailed Description of the Invention

In the following, preferred embodiments of the adhesives, electrodes, and secondary batteries according to the invention, as well as of the production method for electrodes according to the invention are described.

Please replace the paragraph at page 3, line 31 – page 4, line 2, with the following amended paragraph:

The electrically conductive adhesive according to the invention comprises an aqueously dispersed fluoropolymer, a conductive material, and an amine or ammonium salt of a perfluorocarboxylic acid. The utilized fluoropolymer is preferably inert toward the processes and the reactions at an electrode and in a battery system.

Please replace the paragraph at page 4, lines 18-27, with the following amended paragraph:

Fluoropolymers utilizable in preferred embodiments are, for example, terpolymers from TFE/HFP/VDF (THF), copolymers from TFE/HFP (FEP), or perfluorooxy-copolymers from, for example, TFE and perfluorovinyl ether (PFA). The fluoropolymers mentioned in Table 1 may be utilized as commercially available products (Dyneon brochure ~~house organ~~ (USA) 98-0504-1025 (CPI)). In Table 1, these are further characterized with regard to their solids content, pH value, melting point, their particle size, viscosity, and the added additives such as emulsifiers.

Please replace the paragraph at page 6, lines 5-10, with the following amended paragraph:

~~If necessary, an additional conductive material is added to the adhesives according to the invention to still increase the contact conductivity. Such additionally utilized~~ A conductive material is added to the adhesives according to the invention,

to improve contact conductivity. The conductive materials may be selected from the group consisting of carbon black, graphite, and conductive organic materials such as electrically conductive polymers.

Please replace the paragraph at page 6, line 33 – page 7, line 5, with the following amended paragraph:

The aqueous adhesive dispersion may for example comprise about 5 to 50 percent by weight, preferably 5 to 30 percent by weight, and in particular 5 to 20 percent by weight of polymers. Furthermore, the amounts of the electrically conductive additives such as carbon black, graphite, polyaniline, polypyrrole or the like, ~~in case these are added to the adhesive dispersion,~~ are about 2 to 30 percent by weight, preferably about 4 to 20 percent by weight, and in particular about 5 to 15 percent by weight.

Please replace the paragraph at page 9, lines 4-11, with the following amended paragraph:

In a further preferred embodiment of the invention, the adhesive according to the invention is applied to the current collector as a film before the active electrode material is applied, and then drying occurs ~~a drying~~. An electrode according to the invention that is developed in such a way, consequently exhibits a multilayered electrode structure comprising a current collector layer, an adhesive layer, and a layer of the active electrode material.

Please replace the paragraph at page 9, lines 20-24, with the following amended paragraph:

1. an adherence to the current collector that is ~~also~~ stable over longer cycling (preferably > 200 cycles, in particular > 500 cycles), i.e. does not show detachment; and

Please replace the paragraph at page 9, lines 25-28, with the following amended paragraph:

2. an adherence to the current collector that is so stable that mechanical stress such as buckling or molding pressure does not lead to cracks, detachments or displacements from the current collector.

Please replace the paragraph at page 11, lines 1-19, with the following amended paragraph:

Example 1

300 parts of a 20 % aqueous dispersion with a fluoropolymer (Dyneon THV 220®) on the basis of TFE, HFP, and VDF with ammonium pentadecafluorooctanoate as perfluorocarboxylic acid-ammonium salt are mixed with a mixture of 10 parts of carbon black (Ensaco), 1 part of polyvinyl pyrrolidone/acrylic ammonium salt (molecular weight 15 - 20,000) and 10 parts of water in a dispersing agent and applied as film to a Cu-foil and Al-foil degreased through washing with acetone (blade coating: 100 nm thick). The foils are heated over the course of 1 hour to

150 °C and left at this temperature for 30 minutes. Afterwards, the foils with the film are tested. The film adheres to both foils, ~~it~~ and is buckling and scratch resistant and solvent resistant[[:]]. N-methyl pyrrolidone (NMP), toluene, propylene carbonate, diethyl carbonate showed after 24 hours of exposure at 30°C no effect at all ~~: e.g.~~ . For example, there was no dissolving, rippling, or infiltrating, i.e. detaching from the foil.

Please replace the paragraph at page 12, lines 8-12, with the following amended paragraph:

After the analogous processing and testing, no changes compared to the film from Example 1 were observed. The solubility test resulted ~~therein~~ that with exposure to NMP (N-methyl pyrrolidone), after 7 days at room temperature, no ~~as well no~~ dissolving or detaching effects were observed.

Please replace the paragraph at page 14, lines 14-16, with the following amended paragraph:

The testing of the adhesives according to ~~the~~ Examples 5 to 9 ~~resulted therein that~~ in the solubility test[[,]] resulted in no ~~a~~ dissolving or detaching effect being observed ~~was not observed as well~~.

Please replace the paragraph at page 14, lines 18-27, with the following amended paragraph:

Comparative Example 1

~~It was operated as in Example 1,~~ Example 1 was followed, with the exception that the dispersion of the terpolymers according to the invention was replaced by a solution of PVDF/HFP (Kynar 2801®, 10 % in NMP and with 10 % carbon black added), in order to coat a electrode foil (Al) therewith. Even after intensive drying (250°C, 5 hours), a re-swelling and, in part, an infiltration of the adhesive layer, was still observed.

Please replace the paragraph at page 14, lines 29-36, with the following amended paragraph:

Comparative Example 2

~~It was operated as in Example 1,~~ Example 1 was followed, with the exception that it was operated with a Li-polysilicate according to US-A-5,580,686 as adhesive. Firmly adhering coatings were formed on the Al-foil, however, during battery operation, an infiltration and detachment of the layer from the foil occurred.

Please replace the paragraph at page 15, lines 21-26, with the following amended paragraph:

The film adheres to both foils, and ~~it~~ is buckling and scratch resistant, and solvent resistant[[:]]. After 24 hour of exposure at 30°C, N-methyl pyrrolidone (NMP), toluene, propylene carbonate, and diethyl carbonate showed ~~after 24 hours of exposure at 30 °C~~ no effect at all~~: e.g.,~~ For example, no dissolving, rippling, or infiltrating, i.e. detaching from the

foil, is observed.

Please replace the paragraph at page 16, lines 12-17, with the following amended paragraph:

Example 12

~~It was operated according to~~ Example 10 was followed, however, a 1:1 volume-mixture of Dyneon FEPX 6300® with PFAX 6910 N® as a 50 % dispersion was utilized instead of the 34% aqueous dispersion of Dyneon THV 340 D®.

Please replace the paragraph at page 16, lines 19-23, with the following amended paragraph:

The dispersion, to which the additives H_3BO_3 and alizarin were added, is processed analogous to Example 10. In this case as well, a firmly adhering film is obtained that after the tests according to Example 1 did not show any detachment from the foil (Cu- and Al-foil) and infiltration.